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DEVELOPMENT AND CHARACTERISTICS OF NEW SOVIET CALCULATING MACHINES

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The building of Soviet calculators has attained considerable development during the period 1946 - 1950.

The calculators being produced, those with which we are becoming familiar, and those in the design stage encompass all categories of calculating machine building -- adding machines, calculators, computing-analytical machines, and electrical machines of continuous action.

Adding Machines

Type SDU-110 adding machines are now being domestically produced.

This single-counter machine performs addition and subtraction with direct balancing and simultaneous automatic printing of the numbers in a single column on paper tape, showing the type of operation.

The reference mechanism is a ten-space mechanism showing the space of the number which is set up on the machine. The counting mechanism has a capacity of ten spaces.

The machine has 11 printing bars, one for symbols and ten for numbers.

The two-cycle SDU-110 can be operated by touch at up to 1,400-1,500 operations per hour (using four- and five-digit numbers, with results being taken on an average of every 25 numbers).

Another similar machine with a wider carriage (SDU-138) is now being introduced.

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The SDU-100 M, weighing 8 kg, is a smaller and more compact model of the SDU-110, which weighs 15 kg.

All machines mentioned above are avsilable in either motor- or manually operated models.

Calculators

At present, steps are being taken to produce simple manual calculating machines -- two types of arithmometers, using the Feliks and the Khokhlov system.

Arithmometers are designed fundamentally to perform multiplication and division.

The ordinary Feliks-type arithmometer has an eight-space rotation counter, whereas the new Khokhlov type has a nine-place counter and increased carriage travel. These structural modifications have expanded the calculating capacity of the arithmometer beyond that of the ordinary Feliks type. The modernized Khokhlov, according to reports from a number of scientists (e.g., Prof. V.P. Vetchinkin and others), is finding considerable use in sciertific research work.

The machine-building industry is also putting out a new key-operated calculator, the VK-2, which performs addition, subtrsction, semiautomatic multiplication, and automatic division. The machine performs the arithmetical operations without recording the results. It has electric drive and a performance potential of 300-330 operations per minute. The VK-2 has a ten-key reference mechanism for nine places, an eight-place rotation counter and a 13-place result counter. There is window in the case where the number which is set up is registered visibly.

The manually operated VK-1 and the fully automatic VK-3, both based on the VK-2, are to be built and produced.

Along with the VK-type calculators, which perform the four arithmetical operations without recording, there is to be introduced a new key-operated printing calculator, type VD-110. The design of this machine forms the basis for a full-text calculator with a wide carriage (invoice).

The VD-110 is of the universal calculator type, giving a printed record and having a complete, automatic cycle of operations. It performs all the arithmetical operations, gives subtotals and balance, and prints results in a single column on paper tape.

The use potential of this machine will exceed that of the ordinary lever arithmometers and the VK-types It has an 11-place reference mechanism, a 16-place counter and a 17-bar printer, including a bar for symbols.

An invoice machine on the basis of the VD-type is designed as a calculator-typewriter combination.

Within the next 2-3 years, therefore, serial production of the following types of calculators will be started: two types of lever arithmometers ten-key manual calculators, ten-key semiautomatic machines with motor drive, ten-key automatic calculators, printing calculators, and calculator-typewriter combinations.

Calculating-Analytical Machines

The group of calculating-analytical machines presently being worked on includes a 45-column tabulator, a perforator, a controller, and a sorter.

The machines are undergoing a number of design changes, and work is progressing on a completely new two-cycle perforator and controller.

The use potential of the machines is being considerably expanded. For instance, production has begun on a two-cycle perforator designed to transfer numerical content from an original registration document to a punch card. The perforations are punched in two processes, which facilitates correction of errors and reduces rejects.

The K-45-1 controller designed to control the punches in the perforators has been rebuilt, improving the machine's reliability and operating qualities.

The design of the 45-column tabulator has also been improved.

Series-production of result perforators was started in 1949. The machine is a supplementary electromechanical device for the T4-M tabulator, and punches result data automatically in the punch cards fed to the tabulator; it also punches identifying markings.

Final work is now being done on unitizing the T-4 tabulator with the result perforator and these units are being produced serially. The perforator may also be used independently as a perforator-duplicator.

Hand-operated, the perforator can handle 2,000 cards per shift. An 80-column perforator has been designed and work has been started on it. Work will also be initiated soon on 80-column controllers and sorters. Work was also begun in 1949 on an 80-column tabulator, the T-5. The machine will have the following basic parameters: 11-space counters, 8 counters, 20 autocontrol columns, 3 stages of automatic control, and a maximum of 63 marks per tabulagram line. The T-5 is based on the T4-M design.

With the development of this equipment, we will have about 15 forms of calculating-analytical equipment.

Continuous-Action Electrical Machines

The electrointegrators which came out in 1949 were designed to solve differential equations. In addition to the types of vacuum-tube integrators which are already being put out, viz., the ELI-14 and ELI-12, on the Gutenmakher system, a type EI-12 electrointegrator is now being worked on and is designed to solve partial differential equations of the elliptical type.

The development of production and enlargement of types produced with respect to all groups of calculating, calculating-analytical and electrical machines, and continuous-action mathematical machines, is an extremely important problem. Its solution will foster extensive mechanization of calculating work and acceleration of computation processes, and will release thousands of persons presently occupied in the performance of calculations by manual methods.

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